

# THE UNIVERSITY OF KANSAS SPACE TECHNOLOGY LABORATORIES

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Telephone:

August 24, 1973

Mr. Timothy White, Code TD4  
Technical Monitor  
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Houston, Texas 77058

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Dear Mr. White:

RE: Monthly Progress Report for May and June 1973, Contract NAS 9-13331.

The University of Kansas Center for Research, Inc. reports the following work performed during the period 15 May 1973 - 30 June 1973.

## 1.0 CONTINUING STUDIES

### 1.1 (Task 2.1.1.2, 2.1.3.1, 2.1.3.2) Development of Catalogue for Back-Scatter Measurements performed to date

For the preparation of a comprehensive catalogue of back-scatter measurements, the open literature was scanned exhaustively to compile a ready reference which will be incorporated with SKYLAB data to form the most detailed catalogue of such measurements. This effort was started in May, 1973 and is a continuing effort. The data taken by different investigators was collated by frequency, look angles and polarizations. Unfortunately the measurements made by two sensors for the same polarization and operating at the same frequency do not provide the same results even though they are supposedly looking at similar targets. The reason for this scatter in measurements is two-fold, (1) the sensors have different characteristics that are not clearly defined and the entire effects of the sensor cannot possibly be removed from any measurement, and (2) the supposedly similar targets are of such a general category that two measurements over two portions of the "same" target would not yield the same results. The targets, for example, are such broad categories as, vegetation, tall vegetation, bare ground.

The classification of backscatter measurements into categories is a problem unto itself. With the gross resolution of the S193 scatterometer, perhaps the only categories worth discriminating are very broad and general ones. For comparison with S193 data, the aircraft and ground based measurements have been classified into eight basic categories.

Further classification and a reasonable comparison criterion between measurements for two sensors is being studied.

(E73-10896) [PREPARATION OF CATALOGS AND  
EQUIPMENT FOR SKYLAB EXPERIMENTS]

N73-29245

Monthly Progress Report, 15 May - 30 Jun.  
1973 (Kansas Univ. Center for Research,  
Inc.) 3 p HC \$3.00

CSCL 05B

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G3/13 00896

1.2 (2.1.1.2, 2.1.3.1, 2.1.3.2) Development of Catalogue for Radiometer Temperature Measurements Performed to Date

In concert with the effort to prepare a comprehensive scattering catalogue, an exhaustive survey of radiometric brightness temperature measurements was also started. The problem of category classification and comparison of data by two investigators is being studied. It is hoped that similar categories can be picked for radiometer data as with the scatterometer data although this matter is presently under study.

1.3 (2.1.3.3) Study of Effects of Atmosphere upon S193 Rad/Scat Measurements

To properly interpret either radiometer or scatterometer data from a target, the effects of the intervening atmosphere upon the signal should be compensated. A study of the effects of the atmosphere upon the radiometer and scatterometer has been initiated and the results and models found in the open literature are being reviewed to adequately compensate this effect.

1.4 (2.1.2.1) Operation of S193 with SKYLAB in Solar-Pointing Mode

Early in the mission, as you will recall, the SKYLAB was having problems maintaining a ZLV orientation. At that point, the urgency prompted a study to establish, if indeed the S193 could be operated while the spacecraft was pointing at the sun. It was established that there were points in the orbit when the S193 Rad/Scat could be operated with the vehicle in a solar pointing disposition. This fact prompted the present study that is trying to establish the regions in the orbit which are suitable for S193 operation with SKYLAB in SI mode; and, whether a slight yaw of the vehicle while maintaining SI disposition could be used to advantage for operating the S193 Rad/Scat.

1.5 (2.1.1.5) Collection of Ground Truth

This task requires a great deal of ingenuity. Many sources have been tapped for possible ground truth and some data has been collected. The present thought is that topographic maps of 1:250,000 along with S190A photographs could provide the necessary land-use classification. Weather stations and satellite photos (and S190A photos) could provide the meteorological truths.

1.6 (2.1.1.4) Data Decommutation and Analysis

The data formats of the computer compatible tapes to be sent by NASA have been studied. Computer routines to strip pertinent data from each record of S193 data are being flow charted. Routines to convert this data to a format that is easier for computation are being studied.

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## 2.0 REPORTS COMPLETED

There were not reports ready to be mailed during this period.

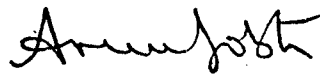
## 3.0 SPECIAL ANALYSES

The errors allowed in antenna pointing due to doppler constraints in the S193 scatterometer were computed and reported.

## 4.0 DATA RECEIVED

No data has been received as yet.

Sincerely,



Arun Sobti  
Senior Research Engineer

AS/rb